

Section 20

36-20

Overview Of The California Oil Market

**Minerals Management Service
Valuation & Standards Division**

DOI FOIA 002142

June 1995

Executive Summary

Background

The value of California crude oil has been at issue for many years. Most notably, the State of California and City of Long Beach have conducted protracted litigation against seven major integrated oil companies, alleging they conspired to keep oil posted prices low and thereby decreased State/City oil revenues. Six of these companies ultimately settled with the State and City but admitted no wrongdoing.

Through the years MMS and the State of California conducted routine audits of these companies' payments on Federal leases in California. The audits addressed a wide variety of issues for periods back to the late 1970's. The auditors generally relied on posted prices as valid measures of market value because significant quantities were traded and sold at posted prices.

In 1986 MMS reviewed the issue and concluded that posted prices fairly represented market value for royalty purposes. At about the same time, several other government agencies conducted similar reviews and reached similar conclusions.

In 1993, following settlement with the State and City by several of the majors, MMS decided to re-evaluate the issue. Before reaching final conclusions, MMS decided to get additional input from other agencies; in June 1994 MMS formed a task force including the Departments of Commerce, Energy, and Justice.

Based on its review of court-sealed documents previously unavailable to MMS, the task force recommended a special audit to determine if Federal lessees in California received consideration beyond posted prices that should be subject to royalties. As of early June 1995, MMS had begun one of these special audits and was planning another. The results should enable MMS to decide whether to expand the audit effort to other companies and time periods or to take other appropriate action. The task force will continue to perform reviews and analysis and provide other input as needed.

About This Report

This report is not a compilation of prices or royalty statistics. Rather, it is meant to provide a basic understanding of the California crude oil market and industry structure for those interested in the royalty valuation issue. The report concentrates on information such as production statistics, pipeline overviews, and refining capacities. The report is clearly tabbed so the reader can directly access specific sections of interest. Please consult the table of contents for a complete summary of information included.

Note: Some table values do not exactly match data in other tables displaying similar information. This is because

1. the information contained in this booklet is compiled from several different sources, and
2. for some purposes production had to be approximated where joint and unit operations were involved.

For example, the Federal offshore production statistics found in "Comparative Production Statistics--Onshore/Offshore, Federal/State" do not match total Federal offshore production in "1993 California Federal Offshore Production by Field." The charts are still valid for illustrative purposes even though slight differences occur.

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CALIFORNIA ONSHORE CRUDE OIL PRODUCTION STATISTICS

- San Joaquin Valley is the dominant production for California onshore production.
 - 77% of total California onshore production
 - 66% of total California onshore production
- The Seven Majors represent 68 percent of SJV production. The State of California and Department of Energy make up 90 percent with the Naval Petroleum Reserve. The balance is produced by independent producers.
- The Seven Majors represent 68 percent of total California onshore production. Independent producers represent 20 percent (State of California and Department of Energy make up the balance).

* Seven Majors are Arco, Chevron, Exxon, Mobil, Texaco, Shell & Unocal

Majors' Regional Production

(1993 CCCOGP* data given in thousand bbls per day)

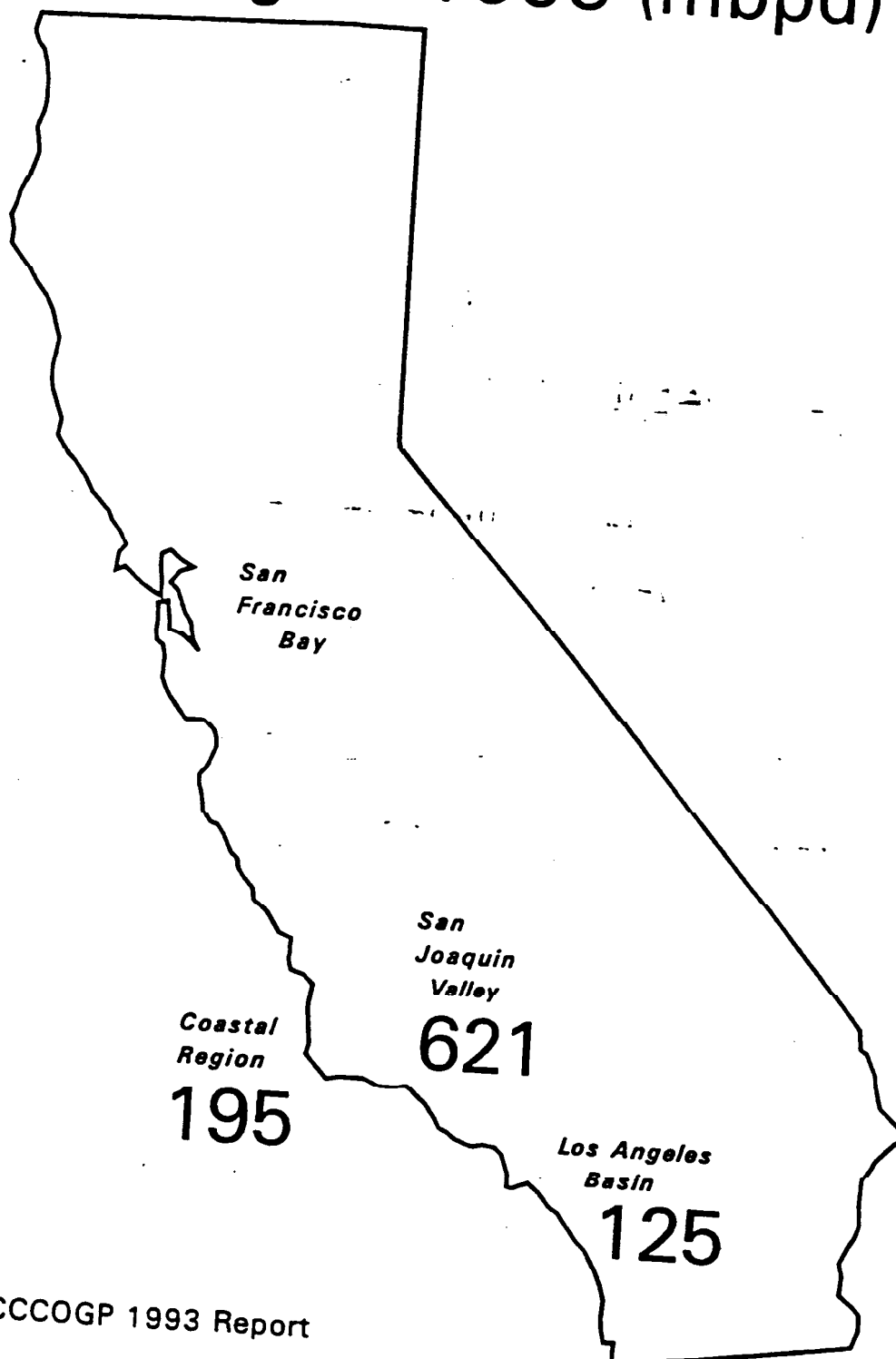
Company	San Joaquin	Coastal**	L.A. Basin**
ARCO	45	4	0
Chevron	8	47	2
Exxon	13	20	5
Mobil	13	12	6
Shell	9	11	20
Texaco	46	2	2
Union	46	34	10
Subtotal	174	45	1
Santa Fe	12	N/A	N/A
NPR	52	N/A	52
Long Beach	19	27	125
Independents	62	19	27
TOTAL	195	19	125

Individual production figures for major producers from operations. Since percentage allocations within these agreements are not known, ALL production was attributed to the operator of record by CCCOGP. This causes the production figures shown above to vary somewhat from company reported data.

*Conservation Committee of California Oil and Gas Producers

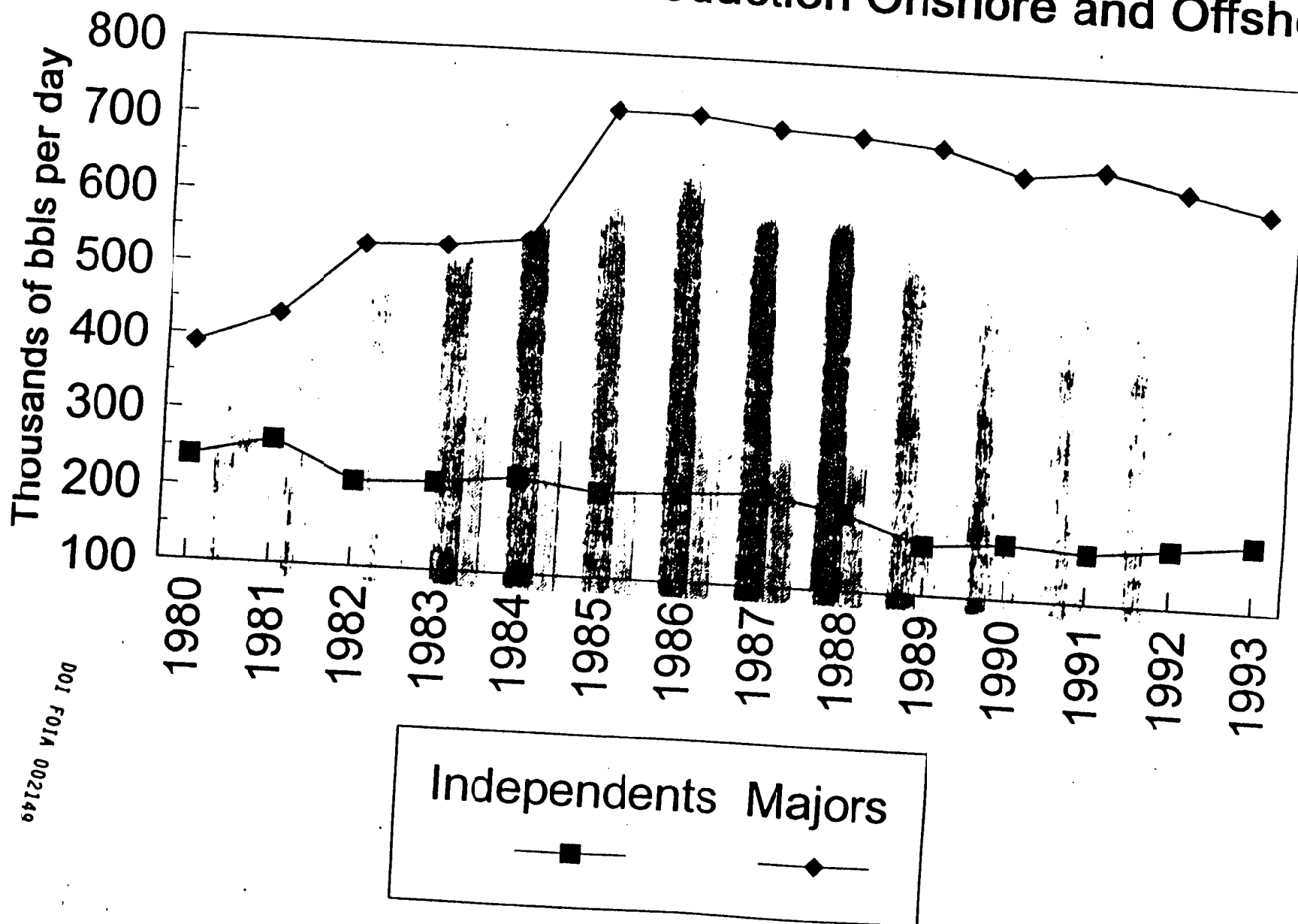
** Includes Both Onshore and Offshore Fields

California Oil Production * by Region 1993 (mbpd)



*Taken From CCCOGP 1993 Report

Majors' and Independent Production Onshore and Offshore



Comparative Production Statistics--Onshore/Offshore, Federal/State

Crude Oil + Condensate (in BBLs)

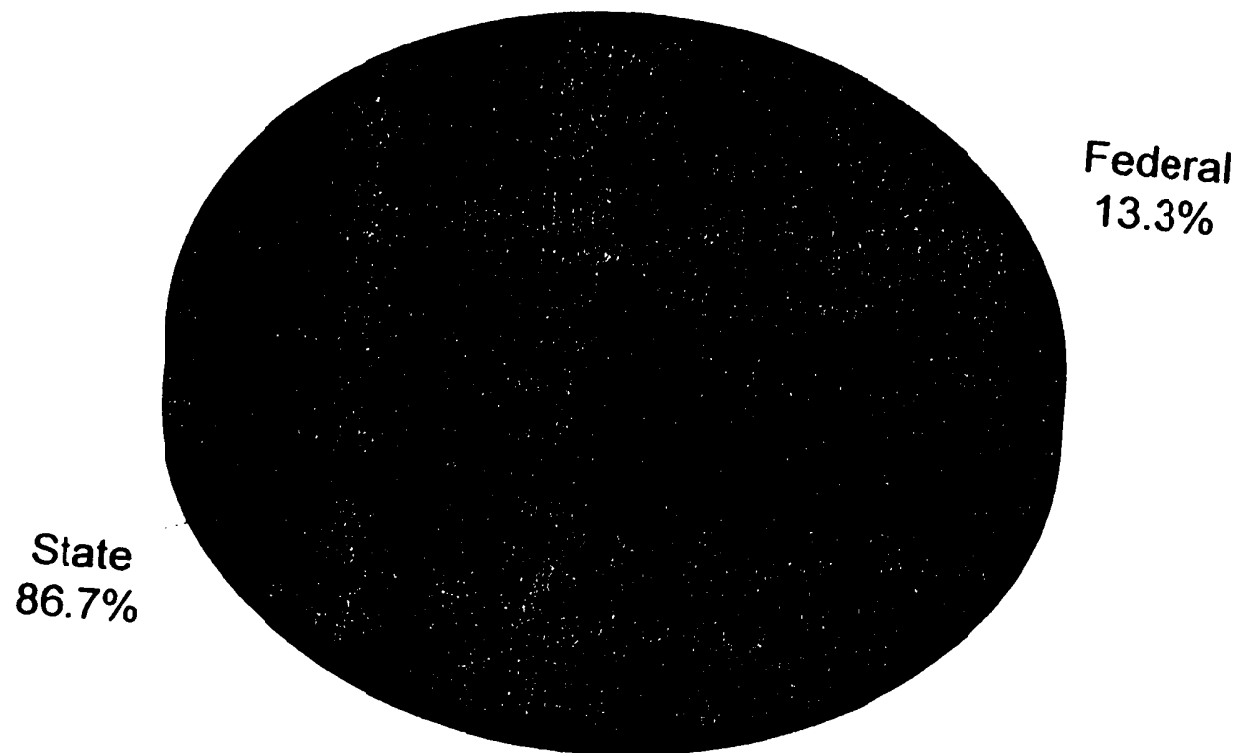
YEAR	OFFSHORE		ONSHORE		YEAR Totals
	Federal Production*	State Production**	Federal Production*	State Production***	
1980	10,118,614	36,978,852	17,582,943	289,279,331	356,959,740
1981	19,619,670	39,164,683	20,544,840	305,785,050	385,094,243
1982	28,471,665	39,810,587	21,702,000	311,877,602	401,861,854
1983	30,558,866	37,702,587	20,650,000	315,997,101	404,908,554
1984	30,254,306	39,508,300	20,065,310	322,943,054	412,770,970
1985	29,781,465	39,588,840	24,710,939	330,751,218	424,832,462
1986	29,227,846	34,897,469	20,826,447	321,960,821	406,712,583
1987	33,556,686	30,360,394	19,884,609	316,349,084	400,150,773
1988	32,615,118	28,202,852	18,712,811	307,739,471	387,270,252
1989	33,072,161	25,396,984	17,721,457	288,085,515	364,276,117
1990	33,312,719	23,559,147	19,624,911	276,939,411	353,436,188
1991	29,146,090	23,243,332	17,070,862	277,791,902	347,252,186
1992	41,222,801	21,943,748	18,512,657	264,442,002	346,121,208
1993	50,078,144	20,369,383	19,453,141	253,266,622	343,167,290
TOTALS	431,036,151	443,527,158	277,062,927	4,183,188,184	5,334,814,420

* Taken from MMS Federal Offshore Statistics 1992 & Federal Mineral Revenues 1993

** Taken from 1993 CCCOGP Report

*** State production is total of all onshore production (taken from 1993 CCCOGP report) less Federal production from 3rd column

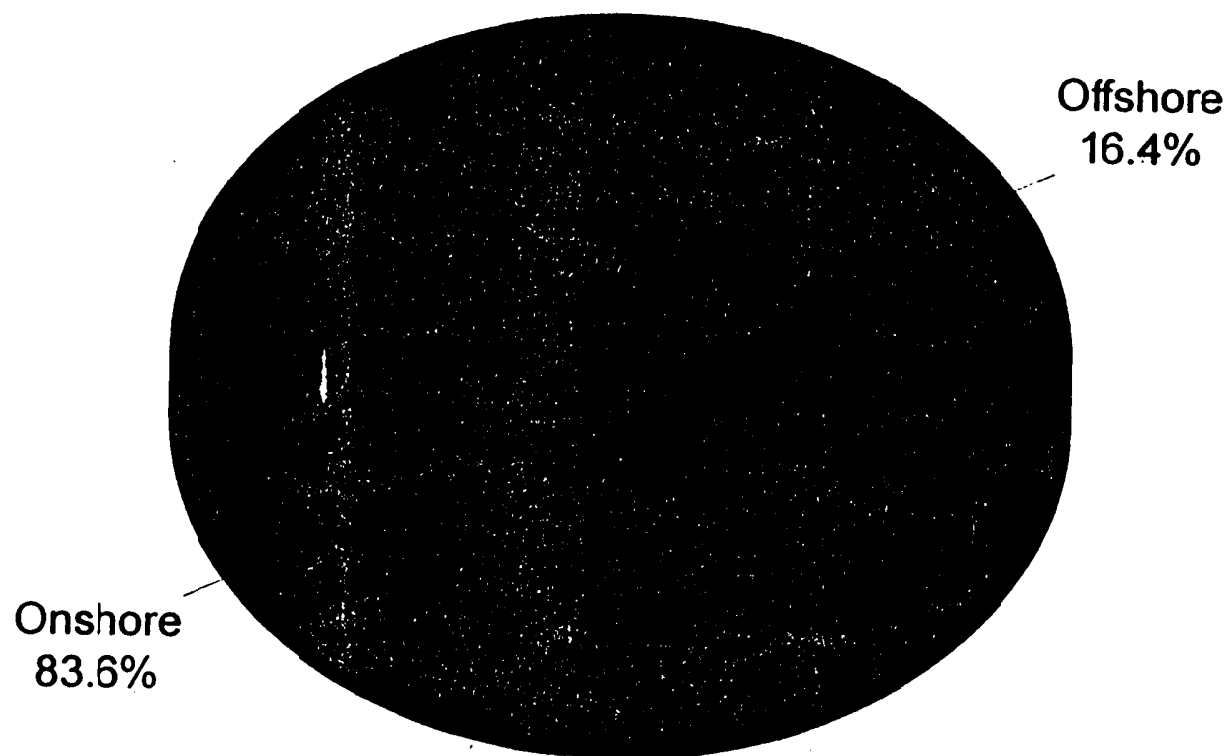
Total California Oil Production--Federal & State*



*State includes all production less Federal share

Total California Oil Production--Onshore & Offshore

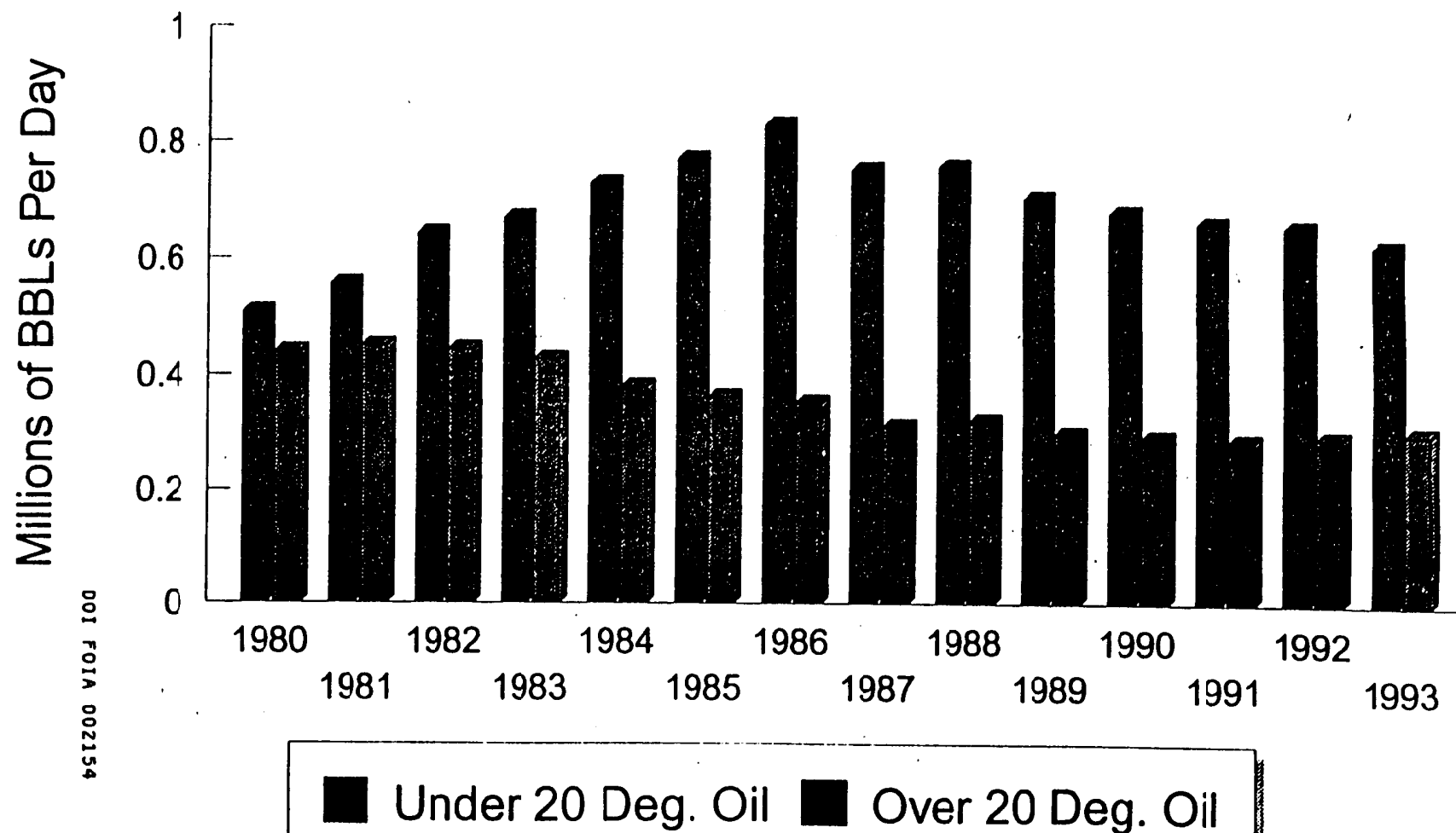
(1980-1993)



GRAVITY STATISTICS

- Heavy crude (less than 20 degrees API) production, as a percent of total California production, is becoming larger over time.
- Heavy crude generally costs more than light crude to produce, transport, and refine.
- More than 85 percent of San Joaquin Valley crude is less than 15 degrees API.

CA Oil Production Above and Below 20 Deg. API



Taken from 1993 CCCOGP report

API Gravities of California Oil For Selected Fields*

	Location	Average Gravity (Degrees)	1984 Production (B/D)	1993 Production (B/D)
<u>San Joaquin Fields</u>				
Cymric	San Joaquin Valley Btwn Belridge/McKittrick	12-14	15,374	26,567
Buena Vista	West San Joaquin Valley	27	5,366	3,951
Elk Hills	San Joaquin Valley	27-35	135,318	65,038
Kern Front	San Joaquin near Bakersfield	13	7,718	6,381
Kern River	San Joaquin Valley east Bakersfield	13	134,425	123,944
Midway-Sunset	Southern San Joaquin Valley	13	138,968	166,921
Poso Creek	North of Bakersfield	15	5,630	655
Tulare Lake	North San Joaquin Valley	39	6,817	167
Yowlumne	Southern San Joaquin Valley	31	12,240	6,157
<u>Coastal Fields</u>				
Carpinteria	Offshore-Santa Barbara	25	9,437	2,757
Cat Canyon East	Santa Maria Valley	11	9,305	1,660
Dos Cuadras	Offshore-Santa Barbara, Near Carp. Field	25	16,371	9,782
San Miguelito	Ventura Country North of Ventura	28	5,306	3,100
Santa Maria Valley	North Coastal	6-9	7,158	1,829
<u>L.A. Basin Fields</u>				
Beta F-OCS	Offshore-South of Huntington Beach	17	14,155	10,383
Beverly Hills	Los Angeles Basin-North	22-27	8,459	4,078
Brea Olinda	L.A. Basin-East of Long Beach	20	7,112	4,026
Huntington Beach	L.A. Basin-Near Long Beach	19	23,638	10,360
Signal Hill (Long Beach)	L.A. Basin-Onshore Long Beach	27-29	8,733	4,819
Torrance	L.A. Basin	20	6,805	2,497
Wilmington	Long Beach Onshore and Offshore	17-27	111,008	61,183

*Taken From 1993 CCCOGP Report

Federal Onshore Oil Production in California, 1993, in Barrels*

San Joaquin Valley**

Field Name	1993 Total	Bbl/d
Midway Sunset	15,203,299	41.653
Lost Hills	1,119,162	3,066
Kern Front	337,383	924
Mount Poso	271,958	745
Cymric	169,106	463
South Cuyama	109,534	300
Belgian Anticline	76,665	210
Poso Creek	69,301	190
Wheeler Ridge	64,898	178
Buena Vista	45,945	126
Mount Poso West	39,977	110
Asphaltto	31,914	87
McKittrick	21,513	59
Cienega Canyon	13,388	37
Kern River	12,012	33
Morales Canyon	6,827	19
Ant Hill	5,946	16
Jacalitos	5,759	16
Cal Canal	5,464	15
Russell Ranch	4,401	12
Pyramid Hills	3,761	10
Semitropic	2,771	8
Chico Martinez	2,647	7
Vallecitos	2,073	6
Kern Bluff	1,638	4
Temblor	149	
Bunker Gas	144	
Rio Vista	121	
Devils Den	105	
Edison	62	
Capitola Park	8	
Totals	17,627,931	48,296

Ventura Basin

Field Name	1993 Total	Bbl/d
Sespe	528,319	1,447
Placerita	499,861	1,369
South Mountain	100,235	275
Oak Canyon	48,747	134
Alison Canyon	41,365	113
Temescal	11,051	30
Castiac Hills	6,751	18
Ramona	4,272	12
Holser	2,982	8
Silverthread	1,493	4
Tapia	237	
Total	1,245,313	3,412

North San Joaquin Valley

Field Name	1993 Total	Bbl/d
Coalinga	207,577	569
Kettleman North Dome	79,657	218
Kettleman Middle Dome	3,353	9
Total	290,587	796

Los Angeles

Field Name	1993 Total	Bbl/d
Sawtelle	200,823	550
Long Beach	2,297	6
Prado Corona	94	
Total	203,214	557

Salinas Basin

Field Name	1993 Total	Bbl/d
San Ardo	5,008	14

Santa Maria Basin

Field Name	1993 Total	Bbl/d
Cat Canyon	242	1

Grand Totals 19,372,295 53,075

*Source of data is MMS PAAS data base and BLM field listing.

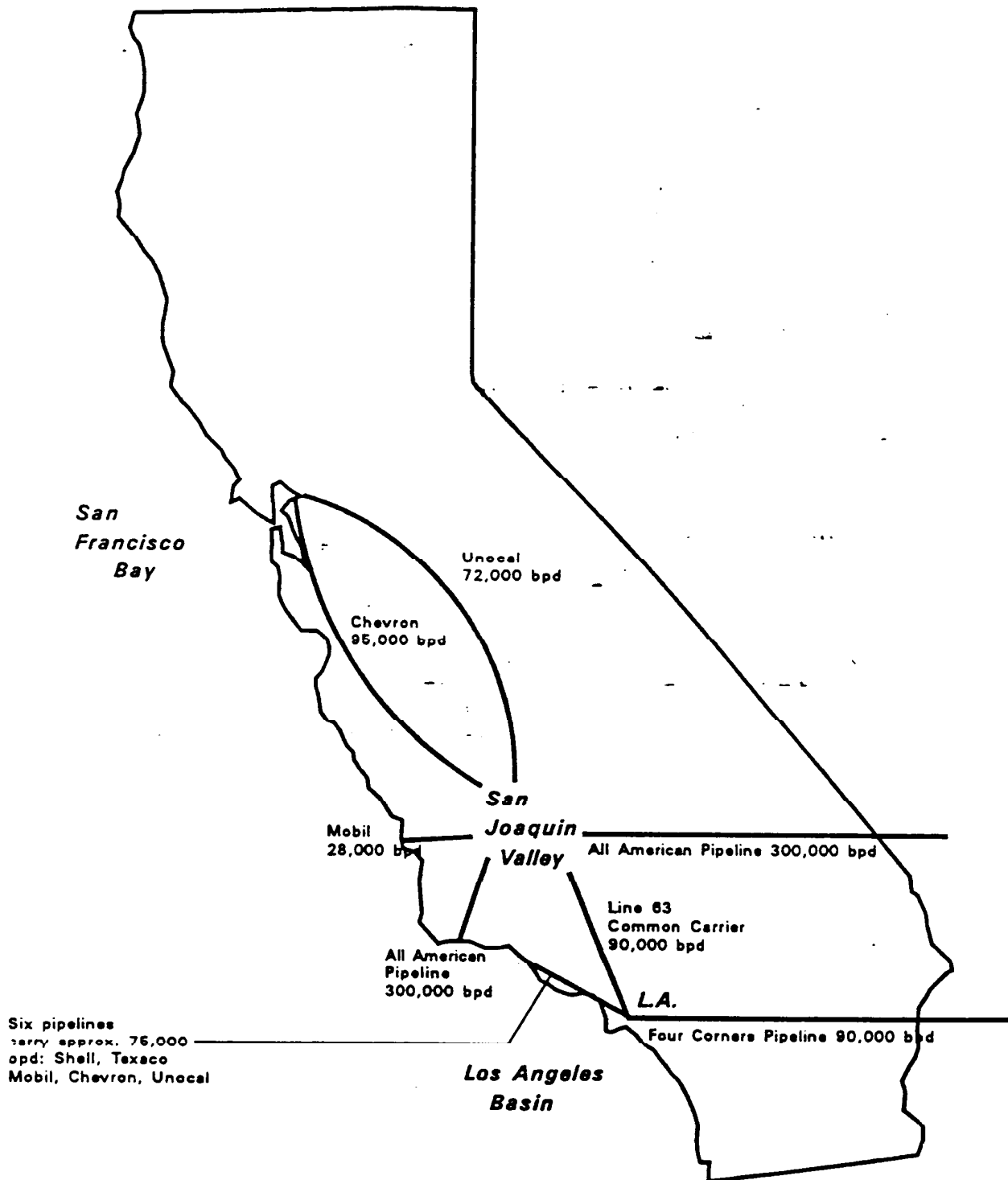
**Does not include Department of Energy's Naval Petroleum Reserve (Elk Hills) 50.861 bbl/day.

1993 Calif. Federal Offshore Production by Field

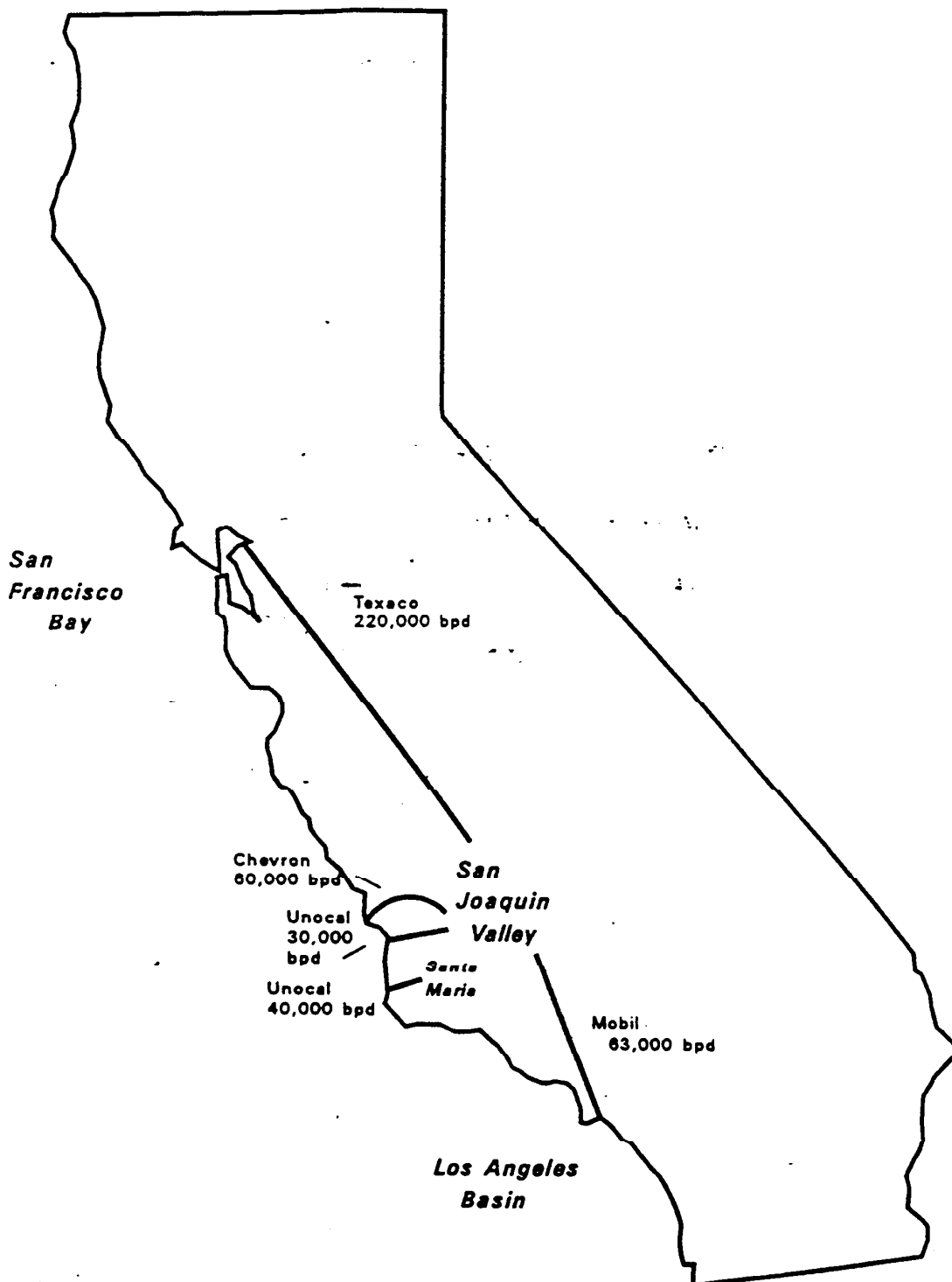
Onshore Delivery Pt.	Field	Total BBLs	BBL/day	Gravity	Pipeline
Carpenteria	Carpenteria	1,005,222	2,754	25	Ventura/LA
	Santa Clara	1,683,064	4,611	23.9	Ventura/LA
Rincon	Sockeye	2,465,168	6,754	25	Ventura/LA
	Dos Cuadras	3,570,586	9,782	25	Ventura/LA
Ventura	Hueneme	436,584	1,196	13.9	Ventura/LA
Los Flores Canyon	Hondo	7,356,859	20,156	17.8	All American
	Pescado	35,991	99	18.1	All American
Pt. Conception	Pt. Arguello	25,906,908	70,978	21.4	All American
Surf/Lompoc	Pt. Pedernales	4,381,828	12,005	17	Unocal/Santa Maria
Los Angeles	Beta	3,790,081	10,384	17	Los Angeles System

Taken From 1993 CCCOGP Report

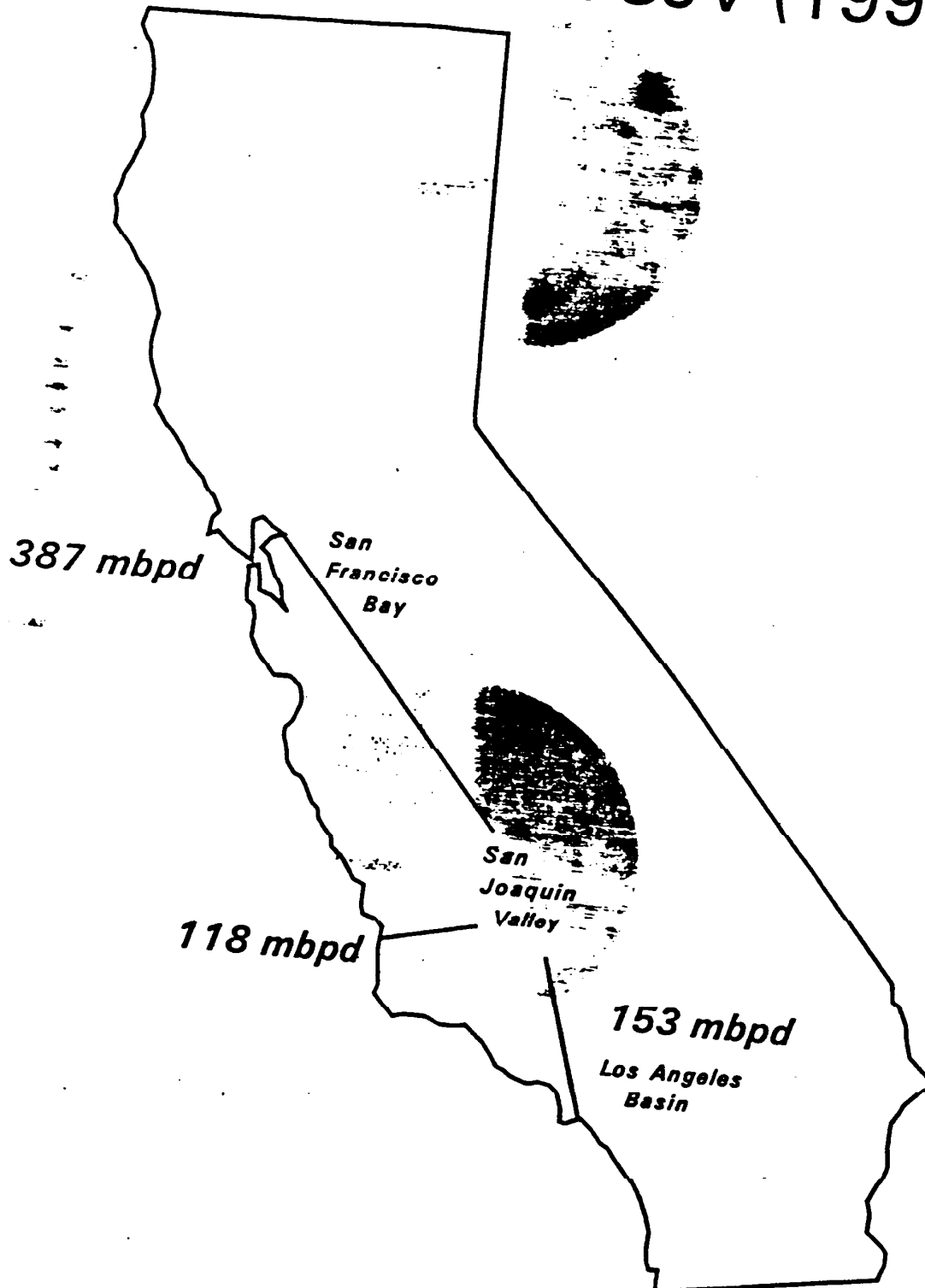
Major Unheated Pipelines in California (1993)



Major Heated Pipelines in California (1993)



Total California Pipeline Capacity From SJV (1993)



GENERAL PIPELINE INFORMATION

- Three proprietary heated pipelines carry crude from the SJV to Los Angeles, San Francisco, and to a coastal terminal at Estero Bay. These lines are owned by Mobil, Texaco, and Chevron respectively. The crude moved to Estero Bay is then delivered to Los Angeles and San Francisco by tanker.
- A heated common carrier pipeline owned by Unocal carries crude from SJV to San Luis Obispo.
- Some of the SJV independents' production can be transported down unheated common carrier Line 63.
- Many onshore independent producers have no economic way to move their oil.
- The All American Pipeline is currently running at one-third capacity from the OCS terminal at Gaviota to the southern end of the SJV. Transportation fees for this segment (\$2.26 per bbl as of 5/95) are the main reason OCS crude sells for less than SJV crude. Very little OCS crude moves to Texas.

GENERAL PIPELINE INFORMATION

(Continued)

- All unheated pipelines are now common carriers. These carry crude oil streams of 18 to 20 degrees gravity or higher.
- Line 1 (a companion to Line 63) was severely damaged in the Jan '94 Northridge earthquake. This reduced capacity by 45,000 bpd. The pipeline will not be rebuilt. Line 63's current 90 thousand bpd capacity may be expanded to 110 thousand bpd as a result.

PIPELINES SERVING THE OCS

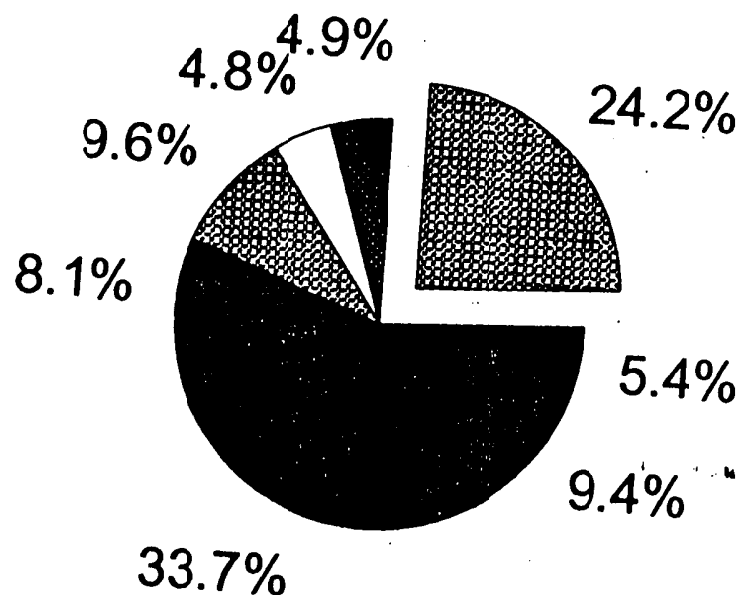
- Point Pedernales production is shipped via Unocal's heated pipeline directly to its Santa Maria refinery.
- Point Arguello and Hondo crude can be shipped over the All American pipeline for further shipment to San Francisco and Los Angeles.
- The Beta Field crude production is delivered onshore to the Los Angeles market.
- Currently, all other OCS crude moves through several pipelines from Ventura to Los Angeles.

GENERAL REFINERY INFORMATION

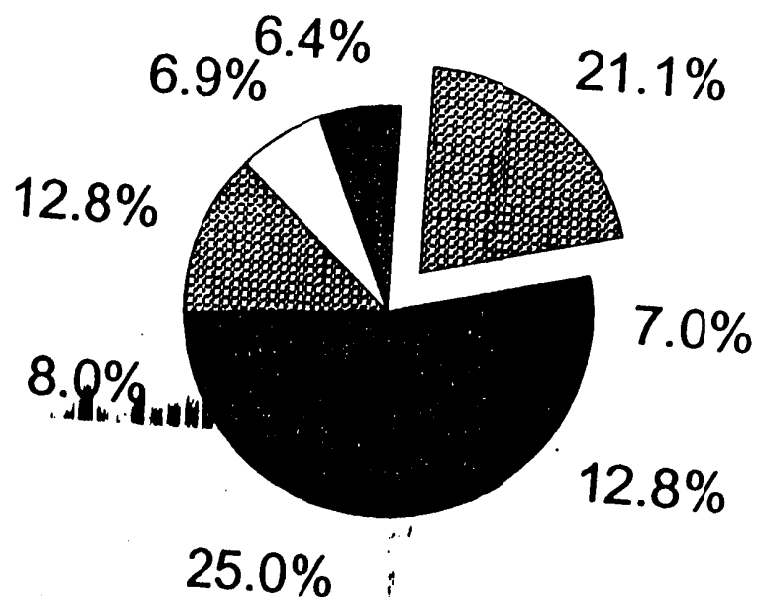
- Majors control nearly 80 percent of refining capacity.
- California refineries use hydrocracking technologies to refine heavy crudes into more valuable products than normal refinery technologies.
- Some critics claim that refining margins are higher in California than elsewhere in the U.S.

California Refining Capacity

1984 Capacity



1994 Capacity



■ Texaco □ Exxon ▨ Unocal ■ Shell
 ■ Chevron ■ Arco ■ Mobil ▩ Independents

Breakdown of California Refinery Capacity*

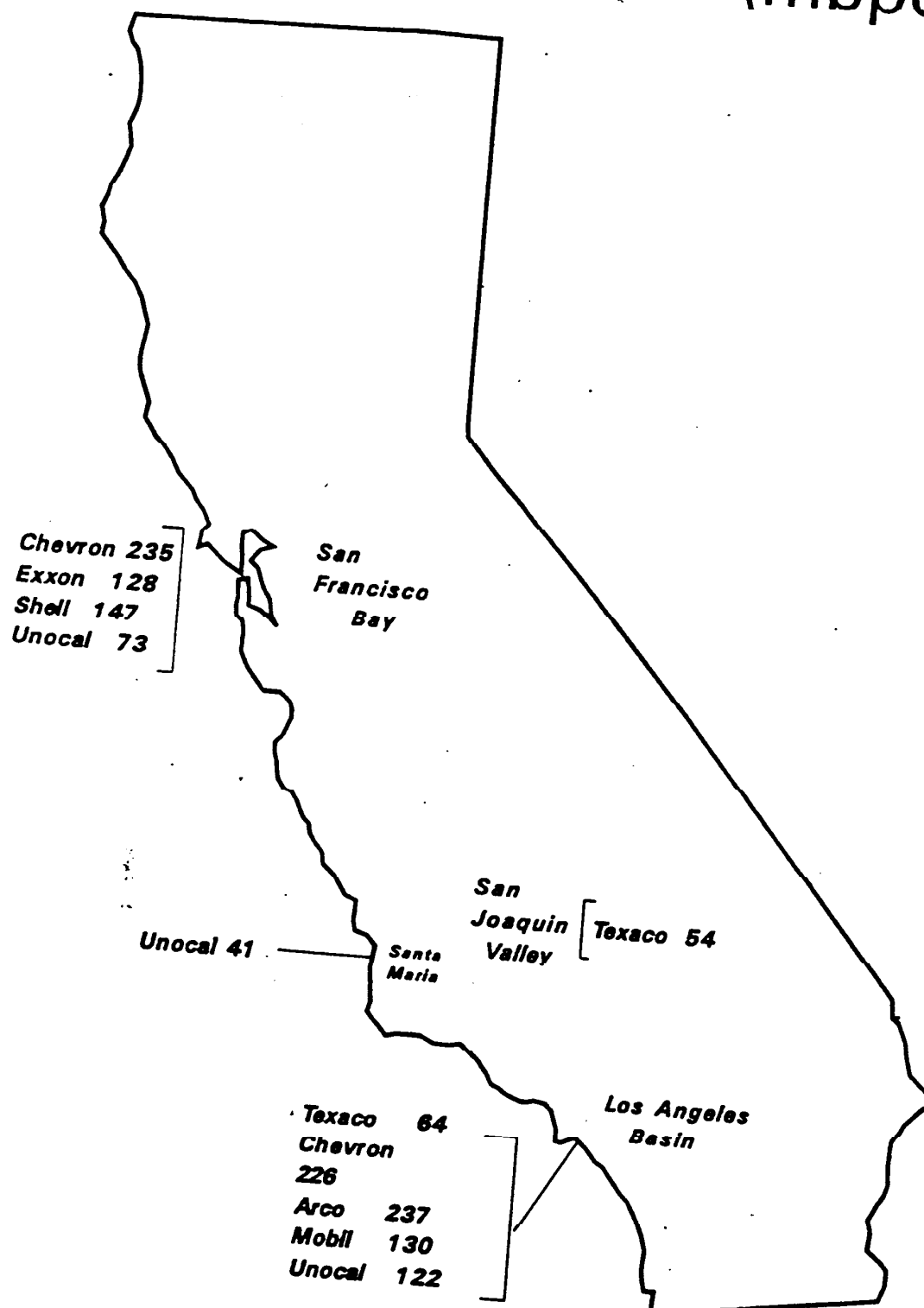
(MBPD)

Refinery Owner	Location	Total Cap	Total Cap	Percent of total	
		1984	1994	1984	1994
TEXACO	Wilmington	75	64		
	Bakersfield	<u>38</u>	<u>54</u>		
	Total	113	118	4.9%	6.4%
EXXON	Benicia	109	128	4.8%	6.9%
UNOCAL	Wilmington	108	122		
	San Francisco	70	73		
	Santa Maria	<u>41</u>	<u>41</u>		
	Total	219	236	9.6%	12.8%
SHELL	Wilmington	93	Closed		
	Martinez	<u>91</u>	<u>147</u>		
	Total	184	147	8.1%	8.0%
CHEVRON	El Segundo	405	226		
	Richmond	<u>365</u>	<u>235</u>		
	Total	770	461	33.7%	25.0%
ARCO	Carson	215	237	9.4%	12.8%
MOBIL	Torrance	<u>123</u>	<u>130</u>	<u>5.4%</u>	<u>7.0%</u>
	TOTAL:	1,733	1,457	75.8%	78.9%
INDEPENDENTS	Beacon	17.3			
	Coastal	10			
	Chem Oil	—	18		
	Champlin-Wilmington	60			
	Conoco	9.5			
	Edgington	41.6			
	Fletcher	29.5			
	Gibson	9.5			
	Golden West	40.6			
	Huntway	13	15		
	Kern	21.4	21.4		
	Lunday-Thagard	8.1	8.1		
	MacMillan	11			
	Newhall	21.4			
	Oxnard	5			
	Pacific Refining	55			
	Paramount	32			
	Petro Fuel & Termina	—	15		
	Powerine	—	46.5		
	San Joaquin Refining	10	24.3		
	Sunland	12	12		
	Tenby	—	4		
	Tosco	126	148		
	Ultramar	—	68		
	West Coast Oil	10			
	Witco	2	10		
	TOTAL:	551.9	390.3	24.2%	21.1%
CA TOTAL REFINING CAP:		2,285	1,847	100.0%	100.0%

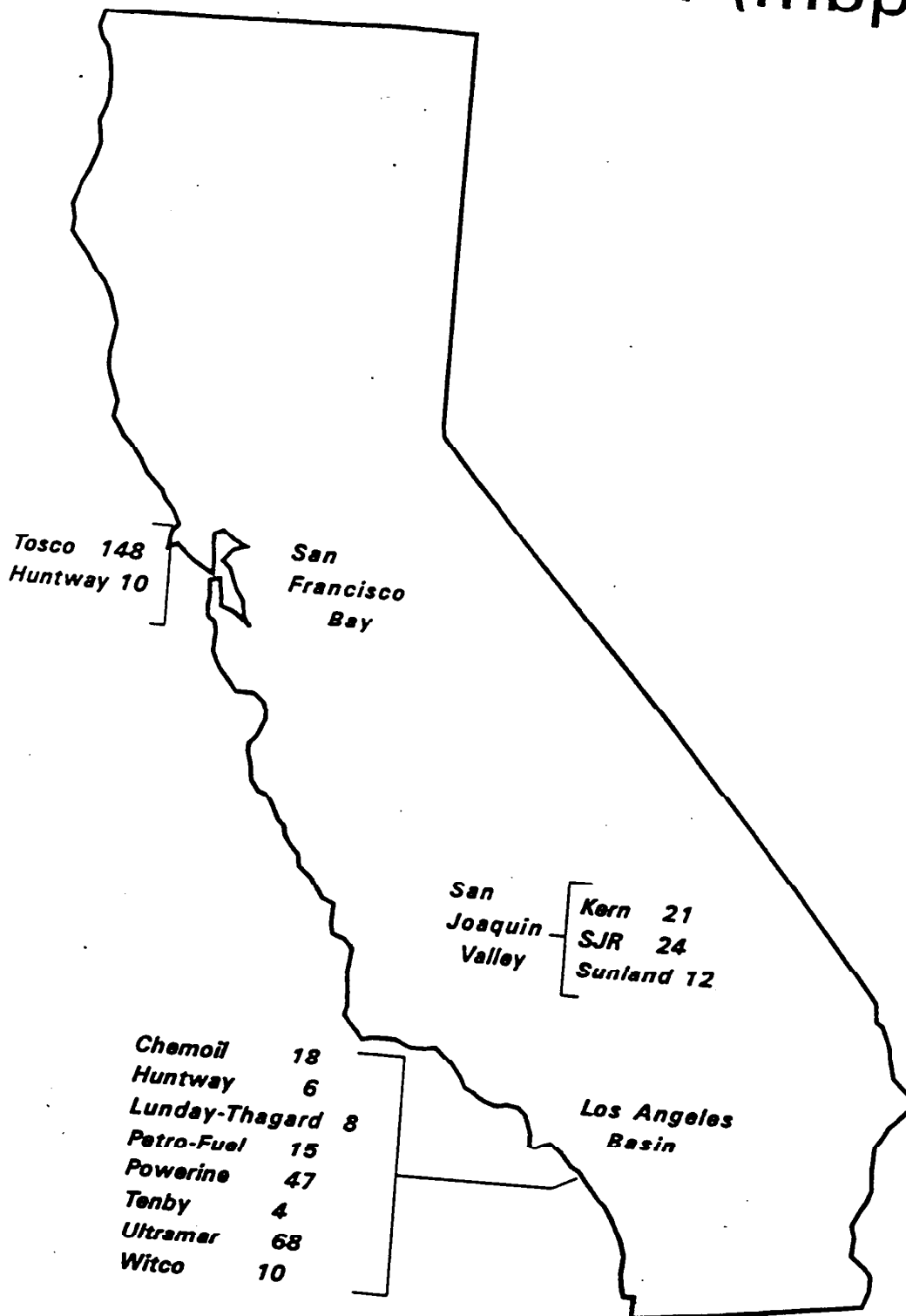
*taken from Department of Energy Statistics

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Major Refinery Capacity in California 1994 (mbpd)



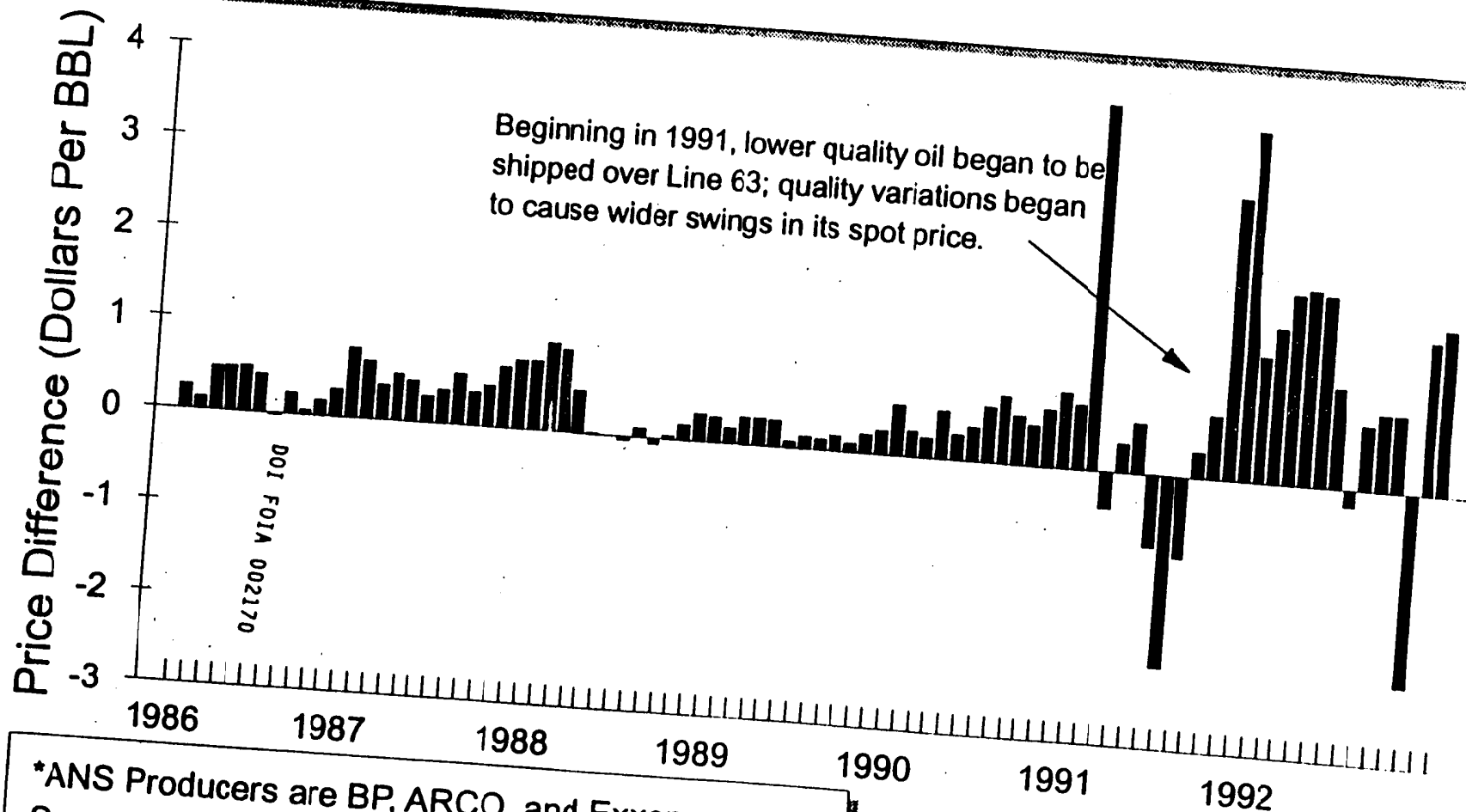
Independent Refinery Capacity in California 1994 (mbpd)



Selected Market Statistics for California Crude Oil

- Roughly 50% of Line 63 production is sold on the spot market.
- Roughly 1 million barrels of Alaska North Slope (ANS) crude enters the California market daily.
- On average, 75% of the ANS crude is sold on the open market with its price typically tied to the spot market. The other 25% moves internally within the majors.
- Federal royalties 1993:
 - Offshore -- \$70,500,000 from 50,000,000 bbls
 - Onshore -- \$23,800,000 from 19,400,000 bbls
- Until recently ANS and Line 63 crude were about 27 degrees API. In 1991, line 63 began to ship crude streams varying in quality which caused the average spot price for SJV crude to fluctuate significantly.

ANS* Spot Prices Less Line 63 Spot Prices (Spot Prices Taken at L.A.)



*ANS Producers are BP, ARCO, and Exxon
Source: Innovation and Information Consultants, Inc.

Section 21

*-Now FACT SHEET-
-ARMSTRONG Used Swamy's letter-*

MINERALS MANAGEMENT SERVICE
ROYALTY MANAGEMENT PROGRAM

SUMMARY OF THE CALIFORNIA
CRUDE OIL PRICING ISSUE

October 20, 1994

Background

The State of California (State) and the City of Long Beach (City) pursued litigation in 1975 against seven integrated oil companies operating in California. They alleged that the major integrated oil companies had conspired to keep posted prices low and that the State and City had been damaged because their oil revenues depended on posted prices. Historically, posted prices have been widely accepted as market value by both producers and refiners as well as by both the State and the Federal Government for royalty purposes. Private royalty owners also typically utilize posted prices to measure market value.

After many years of litigation, six of the companies involved (ARCO, Shell, Chevron, Mobil, Texaco, and Unocal) reached settlements to end court actions alleging undervaluation on State and City leases. While their motives for settling are unclear and issues other than valuation were involved, the companies admitted no wrongdoing. A seventh defendant, Exxon, went to trial and was exonerated. That case is under appeal. Given the length and circumstances of the litigation, it is not clear whether the companies settled as a practical matter to cut off the litigation, whether they felt their potential exposure warranted settlement, or both.

Minerals Management Service (MMS) Involvement

The Minerals Management Service, and under MMS contract authority, the State of California Controller's Office, have conducted routine audits of the same companies' payments on Federal leases in California. The audits addressed a wide variety of issues for periods back to the late 1970's. The auditors did not uncover evidence of the majors wrongfully attempting to undervalue crude oil. The audits accepted posted prices as valid measures of market price.

Nevertheless in 1986, as the litigation continued, MMS contacted State of California officials and other sources to obtain information to review these specific allegations of improper valuation. After reviewing this information, MMS concluded again that the system of posted prices existing at that time fairly represented market value. Also weighing heavily in MMS' decision not to intervene was the fact that the State and City had been unsuccessful in their antitrust claims in court.

In a similar timeframe, the General Accounting Office (GAO), Arthur D. Little (under contract with the Internal Revenue Service (IRS), the Department of Energy, the Justice Department and others conducted similar studies. Many found that occasionally there were differences between the posted crude prices the majors utilized to pay some producers and the prices of crude oil sold at auction. However, none of the studies contained conclusive evidence of illegal activities. Moreover, because the posted prices were utilized in many arm's-length transactions by parties unaffiliated with those posted prices, the IRS and MMS concluded that posted prices appeared to reflect market value and the GAO found no evidence to dispute that conclusion.

The MMS was asked by California to reevaluate the issue in late 1993, in part because of the recent settlements. The MMS chose to look initially at the size of the issue to see if it was worth a major reevaluation. Using unverified data from the plaintiffs' legal counsel and their consultants, coupled with production from federal lands, MMS estimated a theoretical maximum underpayment of about \$400 million for 1960-1992. Essentially, MMS took its data on the volumes of production from Federal leases in California and simply multiplied using the State's purported underpayment figures. Since this was not a DOI evaluation of underpayment, but merely a scoping of the issue, no report was issued. However,

incorrect press reports have repeatedly stated that MMS believes that \$400 million in underpaid royalty may exist. The MMS has no such finding.

Because of concerns about reopening issues which were previously studied, MMS continued its studies in early 1994 by examining the period 1986-1992. That period was initially evaluated and preliminary conclusions reached in April 1994. Since MMS works closely with the State of California's Controllers Office in auditing mineral revenues in California, that draft report was shared with them. The Controllers Office felt MMS should examine data under court seal before concluding its evaluation.

Interagency Review

Because the State of California auditors felt so strongly about the issue, MMS formed an interagency task force in June 1994 with some of the agencies that had also reviewed the matter previously - Commerce, Energy, Justice and Interior. The purpose of the task force is to obtain any additional data that would enable a final determination to be made regarding whether the majors wrongfully undervalued crude oil from Federal leases. One important source of information is the court-sealed documents. The Department does not expect to take an official position until that evidence is obtained and analyzed.

Settlements

MMS occasionally enters into multi-issue royalty settlement agreements with its larger payors, among them companies involved in the California crude oil controversy. These agreements are designed to settle legitimate royalty disputes where reasonable people can disagree. Litigation is a costly and time consuming way to settle complex technical issues. Such agreements often exclude from settlement issues for which MMS or the companies wish to reserve their right to resolve the issue through other means such as litigation. The State participated with MMS in negotiation of such an agreement with Chevron, and concurred in language to exclude from closure the subject crude oil undervaluation issue for periods after 1980.

A reporter raised a question concerning why those settlements do not contain clauses prohibiting the repeating of behavior deemed to be unacceptable. DOI has a lease contract with those companies. If it is felt they are intentionally underpaying royalty owed to the Federal Government the DOI can cancel the lease(s) or seek other civil and criminal sanctions. These settlements normally resolve one time, or old issues where reasonable people disagree on how MMS' rules should be applied. If it is a recurring issue that needs judicial clarification, MMS simply won't settle it. If it is a complex technical issue with considerable litigation risk, a settlement may be in everyone's best interest. MMS approaches these global settlements very carefully, with all relevant parties within DOI represented, including appropriate State representatives.

Statute of Limitations

In regard to the statute of limitations, the Department is now involved in several lawsuits in which application of the general federal statute of limitations for contract claims is in dispute. Last year, the Tenth Circuit Court of Appeals ruled against the companies' position that the Department has only 6 years from the date of an underpayment to seek collection. Instead, the Court found that the 6 year period does not run until MMS completes its audit which must be initiated within 6 years of the underpayment. In more recent cases, the Government maintains that the statute of limitations does not apply at all in the context of oil and gas royalty collections. The industry claims that it does. The Fifth Circuit Court of Appeals recently ruled in the Department's favor on this issue, but the plaintiff plans to seek a rehearing before the court.

Under other laws, oil and gas lessees are required to keep their records for 6 years. They may dispose of records after that if the Department has not put them on notice to retain them for an ongoing audit.

Section 22

Professional Resume' Of
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J. Benjamin Johnson, Jr. ("Benjy") is currently the Chief Executive Officer of Summit Resource Management, Inc. and the President of Peyton Creek Minerals, Inc. In addition to his daily management responsibilities with the two companies, he also provides consulting services in petroleum engineering and crude oil marketing. He is a petroleum engineer and technical manager by background and has over 18 years experience in operating and managing natural resource development.

Professional Work Experience:

10/93-Current: Summit Resource Management, Inc. - Chief Executive Officer
Dallas, TX

Specifically focused on adding value for independent petroleum producers and royalty owners. Co-founded the firm and managed growth within 18 months to marketing over \$60,000,000 of crude oil annually for several independent oil producers. Assist clients in value optimization of their natural resources through financial analysis, crude oil marketing and petroleum engineering. Serve as expert consultant in issues involving crude oil valuation and petroleum engineering. Teach professional development courses in crude oil marketing.

3/95-Current: Peyton Creek Minerals, Inc. - President
Dallas, TX

Manage the development of phosphate mining operations and processing plants to make deflourinated phosphate feed supplements for the poultry industry. Coordinate strategic planning, chemical engineering, corporate funding, process operations, and international marketing for development of the business entity.

1/91-10/93: ARCO Oil and Gas Company - Eastern US Crude Oil Marketing Manager
Dallas, TX

Manager and final approver for all crude oil marketing arrangements in the eastern half of the United States, including the offshore Gulf of Mexico. Responsible for implementation of lease crude oil sales, contract administration, and implementation of strategic commodities hedging on all domestic cash crude oil markets and commodities exchanges in the US and the United Kingdom. Annual revenue responsibility was more than \$600 million, and marketing profits increased each year. Consistently ranked as one of the managers with highest career potential in the Fortune 100 company. Voluntarily left ARCO together with ARCO's crude oil marketing manager for the Central US to form Summit Resource Management, Inc.

(Updated 8/12/95)

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7/86-1/91: ARCO Oil and Gas Company - District Engineer
Bakersfield, CA

Managed all reservoir engineering, reserve reporting, unitization negotiations, exploration support, litigation support, acquisition and divestiture valuation, and new venture development for ARCO's oil and gas operations on the west coast of the continental US. Was the key architect of the Coal Oil Point litigation settlement involving dismissal of a \$1 billion lawsuit against the State of California and surrender of offshore State leases in return for allowing ARCO the right to develop an enhanced waterflood project in the Long Beach Unit. (After successful implementation of the plan, ARCO Long Beach, Inc. was created to manage the ongoing operations and has recovered over \$500 million to date.) Also managed negotiations and favorable settlement of the Long Beach Unit final equity determination involving several major oil companies, the City of Long Beach, and the State of California. Supervised development of new technical computing software system for petroleum engineers and coordinated leading edge petroleum engineering research with ARCO's corporate research center.

10/85-7/86: ARCO Oil and Gas Company - Staff Reservoir Engineer
Dallas, TX

Provided technical staff support for ARCO's executive management and taught petroleum engineering courses to ARCO engineers. Reviewed major capital requests to corporate management regarding exploration, development, and acquisitions. Initiated special studies on ARCO general operations, including technical personnel development and computing systems optimization.

9/84-10/85: ARCO Oil and Gas Company - Senior Operations Engineer, Offshore/EOR
Lafayette, LA

Was the petroleum engineer in charge of the multiple-contact miscibility enriched gas injection project in the South Pass Block 61 field, the largest offshore enhanced oil recovery project in the world at the time. Work included constant optimization of all oil well producing systems, proposing and implementing new wells and workovers, and optimization of present value. Developed a computerized system for balancing gas production with severe facility constraints to maximize overall economic value, resulting in an immediate oil production increase of 200 BBL/Day. Developed a system for tracking of purchased NGL's through multiple reinjection cycles, resulting in annual tax savings of approximately \$2 million. Implemented new system for optimization of producing wells to reduce costs of redrills and workovers and maximize present value of the enhanced oil recovery project.

4/84-9/84: ARCO Oil and Gas Company - Senior Operations Engineer, Onshore
Lafayette, LA

Responsible for daily field engineering operations of several south Louisiana onshore fields. Initiated, designed, and implemented a CO₂ Huff & Puff enhanced oil recovery project in the South Jeanerette Field. Conducted routine economic analyses of onshore producing properties and completed SEC reserve reporting for the area. Lobbied in the Louisiana state capital on behalf of ARCO for certain new oil industry legislation. Was the District Coordinator of the ARCO Speaker's Bureau and was selected as the "Outstanding Speaker of the Year" in 1985. Received an Exceptional Contribution Award from ARCO for efforts in managing the onshore fields.

1/83-4/84: ARCO Oil and Gas Company - Special Projects Engineer
Lafayette, LA

Performed reservoir engineering analyses for Louisiana and offshore Gulf of Mexico. This work included numerical reservoir simulation of certain enhanced oil recovery projects involving multiple contact miscibility. Conducted full economic analysis for large offshore lease sales. Coordinated all engineering recruiting and development for the District office, supervising and training all newly hired engineers.

(Updated 8/12/95)

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7/82-1/83: Management Control Systems, Inc. - President
Las Vegas, NV

Designed and sold turn-key computer systems for small businesses. Developed one of the first integrated micro-computer management system for the video rental industry. Helped clients utilize innovative marketing tools that reduced costs and increased rental revenues. Assisted clients in general business optimization studies.

5/79-7/82: ARCO Alaska, Inc. - Operations/Analytical Engineer
Anchorage, AK

Provided petroleum engineering staff support for Prudhoe Bay and Kuparuk fields on the North Slope. Developed the first full-field simulator for the Kuparuk field and used that tool to efficiently design the overall field development, including placement of surface facilities and long term forecasting of reserves. Coordinated the design and implementation of the surveillance program for the first Prudhoe Bay enhanced oil recovery project. Coordinated the Surveillance Subcommittee of the Prudhoe Bay Unit, involving assignment and management of technical responsibilities between ARCO, Exxon, and BP. Was also active with the ARCO Speaker's Bureau and was elected as the Secretary/Treasurer for the Alaska Section of the Society of Petroleum Engineers.

12/78-1/79: ARCO Alaska, Inc. - Temporary Engineer
Prudhoe Bay, AK

Executed a well testing program for the Prudhoe Bay Unit to develop the Prudhoe Bay Allocation System of measurement and reporting well production volumes.

6/78-8/78: AMOCO - Summer Engineer
Denver, CO

Provided temporary support for staff engineers. Identified an old field in Lipscomb County, TX with large gas recovery potential. Designed and recommended a 35-well infill drilling program which was approved and later successfully implemented.

12/75-8/77: V.E. Construction - Temporary Contract Worker
Offshore Cook Inlet, AK

During all college breaks, worked offshore as welder's helper, roustabout, and relief platform operator. Helped rebuild the King Salmon platform after the 1976 explosion.

Education:

M.S. - Engineering Management The University of Alaska

1979-1983

Major GPA: 4.00/4.00, Overall GPA 3.90/4.00

Emphasis: Economic Optimization of Integrated Projects

Papers:

1. "Performance Appraisal of Employee Professionals: A Practical Approach for Large Corporations", 12/81
2. "Assessment of Produced Gas Disposition, Kuparuk River Field, North Slope Alaska", 7/82

B.S. - Petroleum Engineering The University of Kansas

1975-1979

Major GPA: 4.00/4.00, Overall GPA: 3.94/4.00

Honors/Awards:

Graduated "With Highest Distinction" and #1 in the Petroleum Engineering class; Recipient of Petroleum Equipment Supplier's Association national scholarship in both junior and senior years, administered by the national Society of Petroleum Engineers and awarded to only one junior and two seniors nationwide annually;

(Updated 8/12/93)

Omicron Delta Kappa, Senior Honor Society - President of KU chapter; Phi Kappa Phi honor society; Tau Beta Pi honor society; Who's Who; President of Society of Petroleum Engineers student chapter 1976-1979.

High School Kenai, Alaska

1971-1975

Overall GPA 3.98/4.00

Honors/Awards:

Selected as the "Outstanding Teenager of Alaska" in 1974; Salutatorian of graduating class; 1st chair trumpet in Alaska State Honor Band; National 3rd place winner in Teen Talent Contest (trumpet); president of debate team; varsity wrestling, track, and gymnastics; registered student lobbyist in Alaska state legislature and statewide chairman of "Students for Bike Paths"

Professional Registration: Petroleum Engineering Registration # 21775
State of Louisiana: 4/19/85 - current

Professional Publications:

1. J. B. Johnson, Michael M. Nanney, John E. Killough, and Y.T. Lin, "The Kuparuk River Field: A Regression Approach to Pseudo-Relative Permeabilities", SPE 10531, presented at the Sixth Society of Petroleum Engineers' Symposium on Reservoir Simulation in New Orleans on January and February 1982
2. K. K. Lo, H. R. Warner, and J. B. Johnson, "A Study of the Post-Breakthrough Characteristics of Waterfloods", SPE 20064, presented at the 60th California Regional Meeting of the Society of Petroleum Engineers April 1990.
3. J. B. Johnson, N. O. Woods, and D. E. Smith, "Integrated Microcomputer Software for Petroleum Engineers - A Team Development Approach", SPE 17776, presented at the Society of Petroleum Engineers' symposium on Petroleum Industry Applications of Microcomputers, June 1988.

(Updated 8/12/95)

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